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CHINA REPORT

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APPLIED SCIENCES

LARGE-CAPACITY MICROWAVE COMMUNICATIONS SYSTEM DEVELOPED IN XIAN

Xian SHANXI RIBAO in Chinese 28 Apr 81 p 1

[Article by He Tingrun (0149 1694 3387) and Zhu Tiansheng (2612 3944 3932)]

[Text] A new type of large-capacity communications system--a 6,000-megahertz, 1,800-channel, telephone and color television microwave relay communications system--has been developed in the PRC by scientists and technicians of the Ministry of Posts and Telecommunications' [MPT] Fourth Research Institute after over 6 years of work. It recently passed technical appraisal in Xian. This communications system is a key developmental project of the State Scientific and Technological Commission. Its success will fill the new frequency band gap in the PRC's communications. It will provide a complete set of useful equipment to the PRC's communications establishment and the television broadcast industry. Also, this system will play a major role in alleviating the current communications' overload, in speeding up posts and telecommunications modernization and in developing the television broadcast industry. This system has 8 channels, each of which can carry 1,800 telephone conversations simultaneously or transmit facsimile, telegraph, broadcast and data with similar capacity. When used for television transmission, each channel can transmit 1 color television video signal and 4 accompanying audio signals. Its total capacity is double the 960-channel microwave communications system presently used in the PRC. In addition to the large capacity, the equipment uses less power and is smaller, more stable and reliable. Research on this new microwave communications system began in 1975. This gratifying achievement was accomplished after 6 years of closely coordinated effort by many scientists, technicians and workers of the MPT Fourth Research Institute, overcoming hardships and problems.

CSO: 5500/4002

APPLIED SCIENCES

APPLICATIONS OF MAN-MACHINE STUDY DESCRIBED

Shanghai DIANZI JISHU [ELECTRONIC TECHNOLOGY] in Chinese No 2, 20 Feb 81 pp 1-5

[Article by Zhang Hanwen [1728 3352 2429]: "Applications of Man-Machine Study in Electronic Equipment"]

[Text] Man-machine study is a peripheral discipline developed in the 1950's. Its subject of study is the system consisting of the human and the equipment and its consideration is to design the equipment from the viewpoint of human physiology so that the equipment is easy to understand, hear, see and operate. Through the study of anthropometry, anatomy, psychology, physiology, esthetics, physics, biochemistry and the working environment, man-machine study provides a broad base for equipment design in engineering and poses new challenges for electronic equipment design. It has gradually received people's attention recently.

I. Human Physiology

The main components of a human body include the head, the torso and the extremities. They are controlled via the nerve system by the cerebrum which is capable of thought and judgement. All characteristics of the human body have great effects on the structure and form of electronic equipments.

(i) Dimension of the human body and force produced by the extremities.

The physical dimensions of different human races are not the same. Table 1 lists the average values of major body dimensions for different areas of China. Data presented in Table 1 are based on statistical values of the 1950's. Since the standard of living and the health standards have improved continuously since the revolution, body measures of the youth have increased, so the figures in Table 1 are presented only for design reference.

代 号	部 位	大 人 区		中 小 人 区		小 人 区	
		男	女	男	女	男	女
A	人体高度 8	1690	1580	1670	1560	1630	1530
B	坐高 9	899	848	877	825	830	798
C	腓骨的高度 10	414	390	407	382	408	387
D	肘下尺寸 11	343	340	339	330	330	316
E	大腿水平长度 12	450	435	445	425	443	422
F	臀部宽度 13	307	307	309	319	311	320
G	肩宽度 14	420	387	415	397	414	386
H	指尖至地面高度 15	683	612	616	590	606	575
I	正立时眼的高度 16	1578	1474	1547	1443	1512	1430
J	正坐时眼的高度 17	1203	1160	1181	1110	1164	1078
K	上臂长度 18	308	291	310	293	307	289
L	前臂长度 19	238	220	238	220	245	230
M	手长度 20	196	184	192	178	180	178

Table 1. Average value of major body dimensions for different areas of China

- Key:
1. Designation
 2. Part of body
 3. Greater body height region
 4. Medium body height region
 5. Smaller body height region
 6. Male
 7. Female
 8. Body height
 9. Sitting height
 10. Length of fibula
 11. Length below elbow
 12. Horizontal length of thigh
 13. Width of hip
 14. Width of shoulder
 15. Height from ground to finger tip
 16. Eye level at attention
 17. Eye level sitting straight
 18. Length of upper arm
 19. Length of forearm
 20. Length of hand

The extremities are the main parts of the body in controlling equipment but all positions cannot allow them to exert the maximum force. Forces that can be exerted by the extremities under various conditions have been measured. Take the arm, for example, if we measure the pulling force that can be produced by a man sitting on a chair as a function of his wrist position, the result would be that shown in

Fig. 1. As can be seen, the maximum pulling force occurs when the wrist is 570-660 mm from the back of the seat. When the arm moves back toward the body, the pulling force decreases.

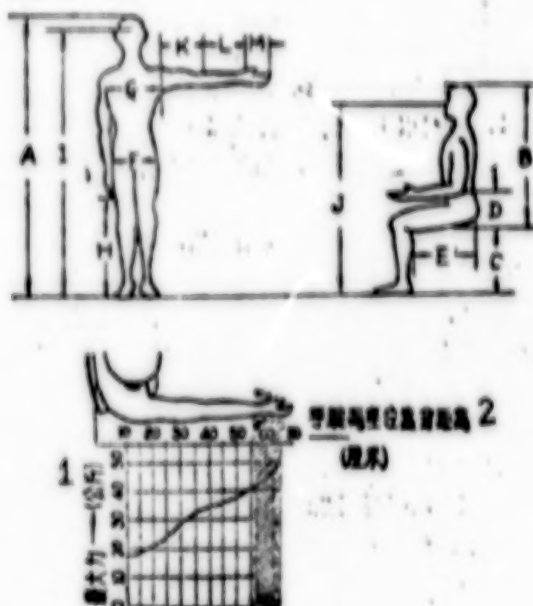


Fig. 1 Maximum pulling force of the wrist as a function of its position

Key: 1. Maximum force (kilogram)
2. Distance between wrist and the back of the seat (cm)

Similarly, legs do not exert the maximum push in any arbitrary position. Experiments show that the maximum force is exerted by a person sitting down when the feet are raised to about 100 mm above the seat.

(2) Vision

An important factor in evaluating vision is the field of view. The so called field of view is the spatial range of vision when a person looks straight forward without moving the eyeballs. Based on the clarity in recognizing objects and the degree of optical nerve fatigue, there are four regions of field of view in the horizontal plane, as shown in Fig. 2 (a):

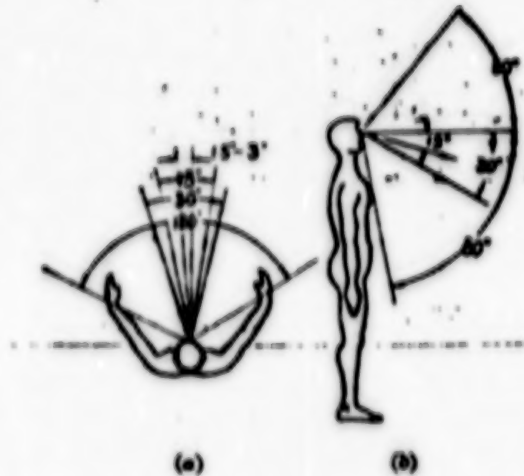


Fig. 2 Field of view

The region within an angle of 1.5° - 3° has the maximum clarity in recognizing objects and is known as the central region. Within an 18° range one can recognize objects for a short moment of time, this region is called the momentary region. In the region spanned by a 30° angle one can recognize objects only by concentration and this region is called the effective vision region. Without rotating the head, one can see objects within 120° , known as the maximum vision region. (Maximum vision region can extend to 220° by rotating the head).

Figure 2 (b) shows the region of field of view in the vertical direction. Normally the line of sight is 15° below the horizontal direction and the region from the horizontal direction to 30° below the horizontal is called the optimum vision region. The maximum region of vision is from 50° above the horizontal to 80° below the horizontal.

Vision is a sense caused by light rays stimulating the retina of the human eye. The ranges of field of view caused by different colors of light are not the same. White light causes the greatest field of view, yellow and blue are next, red is even less, and green causes the smallest field of view.

(3) Hearing

Hearing is the sense caused by sound waves stimulating the human eardrum. A young man with normal hearing in a free sound field senses the minimum sound intensity in the frequency range of 800 to 5000 hertz. Sound with higher frequencies (above 1500 hertz, say) or lower frequencies (below 100 hertz, say) can both be annoying. Experiments show that a high frequency sound is more bothersome than a low frequency sound of equal intensity.

Noise causes people to make mistakes in their work. Noise above the 90 decibel level causes the most errors and high-pitched noise seems to be worse. Subway and train noise encountered in our daily life and the sound level 1 meter from an automatic lathe are all around 90 decibels.

(4) Human reactions to external signals

There are different signals at every moment in our environment and we react to these signals in various degrees. It has been stated that hearing reaction is somewhat more accurate than visual reaction and when two hearing signals are received, it is easier for us to recognize the signal with the higher intensity. When we are fed with a hearing and a visual signal simultaneously, our reaction is faster than when there is only one input (i.e. hearing signal only or visual signal only).

Also, the arm's movement speed toward the body is faster than that away from the body and downward movements of the extremities are faster than horizontal movements. In this section we have briefly introduced some of the important characteristics of a human body. Actually, the human body consists of many extremely complex organs. In the design of electronic equipments, we need to use the data of man-machine studies and carefully design the proper layout and the actual mechanisms.

II. Layout of the Human Body and the Electronic Equipment

Electronic equipments are broadly used in industry, agriculture, defense and daily life, so, in the consideration of the overall layout of the equipments, it should be convenient for the great majority of people to use. For example, when an operator sits in front of the console with his legs in the space under the console, the space beneath the console should be compatible with the body height of the operator. See Fig. 3. If the console is situated too low, a taller operator will bump his knees on the console. Therefore, considering the height of the operator plus a certain extra space, the height of the space under the console should be at least 620-630 mm. Also, in designing the horizontal distance between the body and the controls on the panel, consideration should be given to shorter persons. When operators with longer arms can reach and touch the control devices on the panel,



Fig. 3 Operating position of console

shorter persons will be inconvenienced by not being able to reach the panel. Thus, in the case of fixed operator seat and control device, the maximum horizontal distance should be taken as 740 mm to suit shorter operators.

In addition, the most ideal posture for a person operating in front of the console is to have the upper arm hanging naturally from the shoulder and the forearm

assuming a horizontal or slightly tilted position. This position allows the muscle to relax and is least likely to cause fatigue. The height of the console can also be determined from the dimension of the human body.

The operating range of the arm on the console can be divided into two areas: the normal working area is the region where the upper arm is held stationary and movements are made by the forearm alone, the maximum working area is the region where the upper arms extend out from the shoulder, as shown in Fig. 4. As can be seen, generally the horizontal work area does not exceed a maximum of $1,500 \times 500 \text{ mm}^2$.

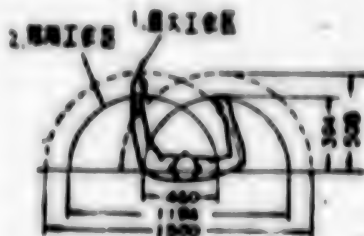


Fig. 4 Horizontal working area

Key: 1. Maximum working area 2. Normal working area

The working region in the vertical direction can be chosen based on the visual range. When an operator sits on a chair and controls the devices on an equipment panel, his working area can be divided into a number of small areas. See Fig. 5. Often-used control devices can be placed in region A where the lower boundary is exactly at the waist level of the sitting operator and frequent operation does not lead to fatigue. Emergency control and devices that require accurate tuning should be situated in region B since it is located in the best visual range and can easily be seen. Auxiliary controls are in region C and region D is the maximum range for placing auxiliary devices.

If the electronic equipment requires standing operation, then the heights from the seat in Fig. 5 should be properly increased according to the operator body height so that the lower boundary of region A is at the waist level of the standing operator. In addition to the consideration just described, proper positions should be chosen for those controls that require large operating force so that the operator can easily exert the maximum force.

Once the overall layout is determined, next comes the detailed positioning of the various controls. Because the fingers need a certain amount of space when operating the controls, devices placed too closely may affect the operation. Table 2 gives the recommended spacing for adjacent controls, numbers within the parentheses are minimum spacings.

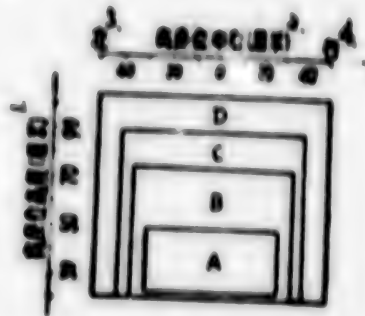


Fig. 5 Working regions in the vertical direction

- Key: 1. Heights from the seat (cm)
 2. Distance from center of seat (cm)
 3. Left
 4. Right

Table 2 Recommended spacing for adjacent controls (cm)

使用形式 1	装置分 2				
	按钮 3	按钮 4	开关 5	手柄、手轮 6	脚踏 7
随意 2	5 (2.5)	3 (1.3)	5 (1.8)	10(8)	15(10)
连续 3		2.5 (0.6)	2.5 (1.3)		10(5)
同时 4	12.7 (7.6)			12.7(7.6)	
随意、连续 5		1.8 (1.3)	1.8 (1.3)		

- Key: 1. Mode of operation
 2. At will
 3. Continuous
 4. Simultaneous
 5. At will, continuous
 6. Type of device
 7. Turn knob
 8. Push button
 9. Parallel
 10. Crank shaft, hand wheel
 11. Pedal

Spacings listed in the table above are merely reference values. Design considerations should be given to different operating conditions and there is no fixed rule.

Recently electronic components are moving toward miniaturization, the smaller the size the better, and it is becoming easier to arrange internal components compactly. But the miniaturization of devices has brought unfavorable conditions for arranging controls on the small panels. For example, the face plate of a certain radio receiver is 155x65 mm and the original design had 13 mm spacing between the volume knob and the frequency selector knob. The frequency selection knob used a 12 mm diameter slotted turn knob shown in Fig. 6 (a). Because of the small spacing, it takes a lot of effort to turn this knob and operate the frequency band switch that has a switching torque of 0.5-0.25 kg-cm. Moreover, since force cannot be easily exerted in operating this knob, one keeps trying to turn the knob and knocks fingers on surrounding knobs. In order to make frequency band switching more convenient, one way is to enlarge the panel size and increase the spacing between knobs and the outer diameter of the turn knob; another approach is to modify the existing knob. In comparing the two approaches, the former is evidently less worthwhile. Later, the designer changed the turn knob into a structure shown in Fig. 6 (b), i.e., adding a ridge on the external profile of the knob. Thus, although the spacing between knobs is still small, thumb and index finger can reach into the space and operate the frequency band switch quite easily with the help of the frictional force provided by the ridge.



Fig. 6 Turn Knob

Another example is the pocket calculator. Due to considerations of carrying convenience, the external size should not be large; with the small size, it is not possible to use large push keys. The inconvenience of pushing small keys with a finger was taken into account in the design, however, one can use a pencil or similar object in pressing the small keys and the dilemma is resolved.

III. Human Senses and the Selection of Indicating Devices

When an operator uses electric equipment, he needs to see, hear and feel as soon as the machine is turned on. So it is important to follow the human senses in designing the equipment. Indicating devices allow us to grasp the performance parameters of the equipment. In order for the operator to observe the display rapidly and accurately, the indicating devices must be designed according to different requirements.

There are many types of indicating devices; the most common type is for the visual organ. On the basis of construction, it can be divided into digital display and analog display (i.e. indicating a given quantity with a dial). Analog display can

further be divided into two kinds: the kind with fixed dial and movable needle and the kind with moving (or rotating) dial and fixed needle or zero point.

Each type of display has its own characteristics. Digital displays are more accurate and faster than analog displays. On the other hand, analog displays are more intuitive and allow the operator to judge readily the direction and speed with which the reading is changing.

Indicating devices have a variety of structures. In certain cases when the dial is very large and there is no need to display the entire dial, the window type display can be used to show the reading to be displayed and keep the rest of the dial behind the panel. In order to avoid having too many readings displayed on the panel, the display can also be designed so that the reading is not constantly being displayed and only indicates the reading when observation is being made; at other times, the display is blank. For the convenience of operation, some displays do not even show the reading when it is in the normal range and only show the difference when the reading exceeds the normal range.

Moreover, for needle type indicating devices, according to the convention of man-machine study, the needle movement direction should follow the direction of manual control in order to avoid illusion and increase the speed of operation.

In addition to vision, there is also hearing among the human senses. Audio indicators can also be used in place of visual display in the design of electronic equipment. For instance, if a visual display can not be arranged on the panel, then an audio signal can be used instead, with the audio signal source mounted somewhere else. As compared to visual display, the audio indicator has the advantage that the operator does not have to stare constantly at the equipment panel to know the operating condition. Also, audio signal is more effective as an alarm.

Naturally, not all visual displays can be substituted with audio indicators. Audio indicators are generally used to give a simple and brief signal that takes effect immediately, or they are used when the surrounding environment does not allow visual display. The sound intensity and pitch of audio indicators should be chosen properly. Eight hundred hertz is the chosen frequency of the signal given off by the receiver speaker on certain ships. The sound intensity is best adjusted by individual operators with the aid of a potentiometer.

In designing the various types of devices and in considering the human sense organs, the requirements stated above can be used as reference and one can also group together and outline the same type of devices or interrelated devices so that they are more eye-catching. Sometimes colors can also be used, various mechanism can be painted into different colors. One foreign-made oscilloscope uses this method: Red knobs indicate adjustments that cannot be calibrated, blue knobs indicate adjustments that affect the displayed pattern and gray knobs indicate adjustments that do not affect other operations. Once the operator is used to the scheme, the meaning is clear just by looking at the color.

IV. Human Operating Ability and Design of Control Devices

When an operator uses electronic equipment, he must make certain moves and the movements always have their limits, including the range of the movement and the

magnitude of the force exerted. Moreover, even though human beings are capable of thinking, human habits should not be ignored in the equipment design and thinking capacity only, emphasized. Devices that are used frequently should be situated at a height between the elbows and the shoulders. Normal operating sequence should be from left to right and up to down. Related controls should be grouped together whenever possible. Display devices should be placed above or to the right of the hand control so that they will not be blocked by the hand. All these are considerations to be taken into account in the design of the equipment.

Frequently used control devices include push button, switch button, turn knob, keyboard, and so on. A comparison of their functions is given in Table 3.

Table 3 Functions and properties of control devices

1	10									
	2	3	4	5	6	7	8	9	11	12
按钮	○									
开关按钮	○	○								
旋转开关		○								
旋钮			○							
曲柄				○						
手轮					○					
控制杆						○				
键盘							○			
其他										○

- Key:
1. Type
 2. Push button
 3. Switch button
 4. Rotary selector switch
 5. Turn knob
 6. Crank shaft
 7. Hand wheel
 8. Control rod
 9. Keyboard
 10. Function
 11. Start
 12. Discontinuous adjustment
 13. Quantitative adjustment
 14. Continuous control
 15. Data input

One should pay attention to operating habits in designing equipment. Figure 7 (a) shows the front panel of a piece of electronic equipment that has two locking mechanisms to fasten the front panel to the chassis. To operate, one only needs to push the base, which has the front panel attached to it, into the chassis and then rotate the locks in the indicated direction and the locking blocks will fasten the base onto the chassis. Since we use two hands to do the tightening, the usual habit

is to turn the two hands both inwardly or both outwardly, so it is easier to operate with the two locks turning in opposite directions. The design in Fig. 7 (a), where the rotations are in the same directions, appears inappropriate and the speed for fastening the locks cannot be fast. It is more sensible to change the design to that shown in Fig. 7 (b).



For devices that require very little force to operate, since very little force is exerted, the user often does not know when the manipulation is completed and this may lead to an operating error. For example, the transmitter-receiver of a single action radio relies on a push button on the side of the case to switch between transmitting and receiving signals, as shown in Fig. 8. Because the push button controls only two microswitches (KMK switches), the action force and travel are both small and the switching is ambiguous. To correct this, a pressure spring can be added under the push button so that the action force and the travel of the switch can be properly increased.

For devices with quantitative or continuous adjustments, it is also important to design the relation between the control device and the display device properly. The displacement (or rotation) of the control device is often represented by C and the displacement (or rotation) of the display device, such as a needle, is represented by D . The ratio (C/D) is known as the control-display ratio. If the design calls for a very sensitive control, that is, a slight movement of the control device causes very pronounced indication, the value of C/D should be small. Figure 9 illustrates the effect of the control-display ratio.



Fig 8 Push button on transmitter-receiver
Key: 1. Push button
2. Microswitch

In using display devices, the value of C/D has marked effects on the operation. The value of C/D may vary from less than 1 to several tens, and should be determined based on the operating situation. If one wishes to have the indicator move to the anticipated region very quickly, a small C/D should be chosen. If one wishes to shorten the time for precision adjustment, the value of C/D is the larger the better.

With a proper selection of C/D, the total adjustment time (the sum of cursory adjustment and fine adjustment) may be reduced by 0.5-5 seconds.



Fig. 9 Effect of C/D value

- Key:
1. Large D
 2. Small D
 3. Small C
 4. Large C
 5. Low C/D ratio
 6. High C/D ratio

Modern electronic equipments require the operator to monitor many parameters and, sometimes, rapid and accurate operations as well. Such increasingly complex problems cannot be solved solely by adding more control mechanisms. In other cases, the equipment may not require too much manipulation but the dimension of the front panel is limited. In these cases we may combine some mechanisms and design multiple-function devices. The most common example of combining a control device with a display device is a push button with an indicator light. This technique has been in use since the 1950's.

The design requirements for an airplane cockpit are very stringent. In order for the pilots to control the equipment effectively, one does not install all the devices on a small and crowded front panel, instead, one decreases the number of special devices and combines the ones used less frequently. Pilots in fighter planes not only have to observe the equipment panel but are also searching for attack targets at the same time. According to the man-machine study, the designer should project the aim target directly onto the goggles of the pilot's helmet. The pilot needs only to keep his eyes on the target image on the goggles and press the firing button of the gun at the proper time to hit the target. All the usual maneuvers of tracking the target can then be eliminated.

Recently automatic tracking and automatic tuning devices are being utilized in communication equipment. Their purpose is none other than solving the speed and accuracy problems of tracking, switching, frequency fine-tuning and circuit control, based on actual operation requirements and human physiology. The internal structure of these equipments is very complex, but controls on the front panel are greatly simplified so that the demands on the operator are greatly reduced as well.

Granted that the design of electronic equipment should satisfy the most favorable operating condition, but this is not the only consideration which merits emphasis in the design work. Other factors such as manufacturing costs, reliability and power consumption should not be ignored either, especially for certain civilian products.

In summary, man-machine study emphasizes the investigation of man and, based on human physiology, carries out repeated experimentation and carefully analyzes the operators' opinions so that electronic equipment can be designed better and better. Electronic equipment can improve the working condition and production efficiency only when it complements the shortcomings of the operator and lets the operator fully develop his initiative. If this consideration is neglected, then, even if the equipment is made of the best material and satisfies all the technical standards, it is not practical if it is inconvenient to use, causes operator fatigue and even frequent operation errors.

Man-machine study will receive ever broadened applications as the electronics industry develops in China.

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CSO: 4008/386

SIDE EFFECTS OF ANTIPSYCHOTIC DRUGS RESEARCHED

Guangzhou SHEAJING JINGSHEN JIBING ZAZHI [JOURNAL OF NERVOUS AND MENTAL DISEASES]
in Chinese No 1, 1981 pp 29-31

[Article by Jiao Nanqing [4255 3352 0530] (3), Li Shenlu [2621 6500 6922] (1), Yu Shicai [0060 0013 2088] (2), Cao Kexi [2580 0344 6007] (2), Li Xixu [2621 1585 4872] (4), Jiang Yanmin [5592 3601 2404] (4), Chen Yanfang [7115 1750 2455] (4), Zhao Peilun [6392 0160 4858] (5), Chen Zhigang [7115 5267 0474] (6), Ji Zhongfu [0679 0022 1318] (6), Tie Shudong [1586 2579 2639] (7), Yang Gengxue [2799 2704 1331] (7), Yang Feixia [2799 7378 7209] (1): "Observations of Side Effects Caused by Anti-Psychotic Medicine"]

[Text] Abstract. This is a comprehensive report on clinical information concerning the side effects of anti-psychotic medicine. More frequently seen are cases of depression and worsening of psychotic symptoms caused by the medicinal drugs fluoropiperidyl alcohol and fluoroperphenazine caprate. Chlorpromazine often causes overly rapid heart beat while fluoropiperidyl alcohol mostly slows down heart beat, yet abnormal electrocardiograms do not affect treatment. Chlorpromazine can cause liver damage due to accumulation in the capillary bile duct while many cases of phenothiazine causing a rise in GPT and allergic dermatitis have been seen. It has been discovered that tardanum may cause thrombophlebitis of the lower limbs. All side effects can disappear after medication is discontinued or after treatment of the specific symptoms has been given.

At present, many varieties of anti-psychotic drugs are widely used clinically. Their various side effects have already caught people's attention. Here, we have combined 10 reports of complications caused by anti-psychotic drugs and related investigations in one article as a reference for clinical work.

Note: (1) Hangzhou City Mental Disease Hospital; (2) Shanghai City Mental Disease Prevention Hospital; (3) Shandong Provincial Mental Disease Hospital; (4) Jining Area Mental Disease Prevention Hospital in Shandong Province; (5) Qingdao City Mental Disease Hospital; (6) Beijing Anding Hospital; (7) Hebei Provincial Second Rongkang Hospital.

1. Worsening of Depressive Psychosis and Psychotic Symptoms Induced by Drugs

Li Shenlu [2621 6500 6922] and Yu Shicai [0060 0013 2088] et al reported on 14 cases of depressive psychosis induced by medicine, 8 cases were males and 6 cases were females aged between 20 and 49. Fluoropiperidyl alcohol was used in four cases, fluoroperphenazine caprate was used in seven, fluoropiperidyl alcohol combined with chlorpromazine was used in two, and chlorpromazine combined with tardanum was used in one case. The dosage of the four drugs was respectively 10-36 mg/day, 36-100 mg/2 weeks, 100-350 mg/day, 100 mg/day. Depressive reactions occurred within 1 month of medication in three cases, within 1 to 2 months of medication in six cases, within 2 to 3 months of medication in three cases, within 8 to 12 months of medication in two cases. At the time, the original psychotic symptoms disappeared (five cases) or partially disappeared (five cases), only four cases did not show visible improvement, but the patients took the initiative to describe various uncomfortable feelings, such as weakness, failing memory, clumsiness of movement and inability to sit quietly. These have caused the patients to show low spirits (10 cases), anxiety (7 cases), passiveness and pessimism (7 cases), suicidal tendencies and self-infliction of wounds (6 cases). After reducing medication (four cases), stopping medication (one case), or simultaneously given tricyclic stimulant to treat depression (two cases), anti-Parkinson's disease drug (three cases), and a combination of the tricyclic stimulant to treat depression and anti-Parkinson's disease drug (four cases), all of the above symptoms disappeared within half a month.

Jiao Hanqin [4235 3352 0530] and Li Xixu [2621 1585 4872] reported 10 cases of worsening psychotic symptoms, all were males 15 to 49 years old. Except one case of manic psychosis, the rest were all schizophrenia. Five cases were given fluoropiperidyl alcohol (5-35 mg/day), four were given chlorpromazine (150-650 mg/day, of these, two were also given anti-choline medicine before worsening), one case was given perphenazine (12-18 mg/day). Psychotic symptoms began to worsen 3 to 28 days after medication started. Outstanding manifestations were excitation and maniacal activity, disorderly movements, attacks on people and destruction of objects and such symptoms of excitation of psychotic activities. Before using the above medication, there were seven cases that did not show symptoms of excitation, another three cases did show excitation originally but it was visibly enhanced by medication. One case developed into a typical case of delirium accompanied by fear, sweating, directional obstruction and rich visual illusion. One case developed into silence and immobility, remaining in a stiff state and urination and excretion were not controlled. Two cases were accompanied by obstruction of consciousness and delirium, three cases showed confusion of consciousness or dreamlike states. Besides the above manifestations, one case developed persecution complex and another case developed more serious delusions of grandeur. Of the patients given fluoropiperidyl alcohol, there were four cases not accompanied by extraconoidal symptoms and reactions of anxiety. The symptoms disappeared within several days after medication was ceased, or after the patients were given small doses of chlorpromazine, black hennane and dolantin and sodium amytal in appropriate cases. Only in the one case of stiffness, medication was stopped and infusion was performed. Stiffness was relieved 2 weeks later. Symptoms of the four cases given chlorpromazine disappeared within 3 days after medication was reduced or ceased. In the one case given perphenazine, the original state was restored 36 days after medication ceased.

II. Effects of Anti-Psychotic Drugs Upon the Electrocardiogram

Jiang Yanmin [5592 3601 2404] and Chen Yaufang [7115 1750 2455] compared the effects of fluoropiperidyl alcohol and chlorpromazine upon the electrocardiogram of two groups of schizophrenic male patients. The patients were grouped in pairs according to their case histories, age, weight and the dosage of medicine given at the time of their first electrocardiogram (on the basis of 1 mg of fluoropiperidyl alcohol being equivalent to 18 ± 2 mg of chlorpromazine) for comparison. Each group had 15 cases. The group given fluoropiperidyl alcohol was between 18 and 46 years old, the dosage was 12 to 90 mg/day. The group given chlorpromazine was between 19 and 44 years old, the dosage was 150 to 1,450 mg/day. The dosage remained unchanged throughout the period of observation. An electrocardiogram was taken once every 2 weeks, totaling three examinations. The results were shown in the following categories: (1) General electrocardiographic abnormality: Comparison of the three electrocardiograms of the two groups showed that the group given fluoropiperidyl alcohol (22.22 percent) had a lower abnormality than the group given chlorpromazine (53.33 percent). The differences between the results of the first electrocardiographic examinations and the total results of the three electrocardiographic examinations of the two groups were highly visible ($P < 0.01$). (2) Abnormal heart beat: The group given fluoropiperidyl alcohol showed abnormally slow heart beat (54-49 times/minute), the group given chlorpromazine showed abnormally fast heart beat (101-125 times/minute). The abnormality of the group given fluoropiperidyl alcohol (11.11 percent) was lower than that of the group given chlorpromazine (28.89 percent). The differences between the abnormalities of the results of the first examinations and the total results of the two follow-up examinations were visible ($P < 0.05$). (3) Q-T variations: During the period of experiment, only one case (35 years old, dosage 1,450 mg/day) of the group given chlorpromazine showed a Q-T extension. (4) Abnormality of ST-T wave: Comparison of the two groups showed the abnormality of the group given fluoropiperidyl alcohol was lower but the difference was not outstanding. (5) During the period of medication, fluoropiperidyl alcohol seemed to increase the electrocardiogram's pulse generation rate while chlorpromazine caused the opposite to happen. Generally speaking, effects of the two drugs on heart beat were more frequently seen, followed by changes in the ST-T wave, and rarely seen were changes in Q-T. Fluoropiperidyl alcohol affected the electrocardiogram slightly less than chlorpromazine. But changes in the electrocardiograms of the two groups were not serious. None of the cases required a reduction of medication or termination of medication and corresponding treatment due to abnormal electrocardiographic indications.

Jiao Hanqin [4255 3352 0530] also reported on the dynamic changes of the effect of fluoropiperidyl alcohol upon the electrocardiogram. The patients were 38 cases of male schizophrenics averaging 32.5 years in age. Before treatment, each was given an electrocardiographic examination for comparison. During the course of treatment, an electrocardiogram was taken every 1 to 2 weeks, totaling 3 to 28 times. The electrocardiograms taken before treatment showed one case of paleomyocardial infarction, 5 cases of myocardial fatigue, and 32 remaining cases were normal (including one 60-year-old patient with a normal electrocardiogram but a history of many years of angina pectoris). The dosage of fluoropiperidyl alcohol was 15-58 mg/day. During the treatment period, consideration

was given to appropriately administer it in combination with artane but other medicinal drugs that affect the heart were not used.

The results showed the following: (1) Heart rate: Heart rate tended to slow down. A comparison of the electrocardiogram taken before treatment and the last one showed different degrees of slowing of the heart rate. In 7 cases, the heart beat rate slowed down less than 10 times/minute, and in 31 cases, the heart beat slowed down 11 to 23 times/minute. There were 14 cases (38 test-times) that showed overly slow heart beats (50 to 60 times/minute). At the time, these patients were given 15 mg/day of fluoropiperidyl alcohol in one case and the rest were given more than 20 mg/day. (2) Changes in the ST segment and T wave: Of the 31 cases of normal electrocardiograms before treatment, there were 12 test-times (11 cases) during treatment that showed higher ST segments and a slight drop in one test. In six test-times (six cases) the T wave was flat or low and flat. In two test-times (two cases) there were double phases. These changes were all regarded as within the normal range, and in later electrocardiographic examinations, these changes returned to their original positions. Even in the one case with a lengthy history of angina pectoris, no effects were caused. (3) Five cases of myocardial fatigue indicated by comparison of the electrocardiograms were given fluoropiperidyl alcohol (average maximum dosage was 23 mg/day) as treatment for 17 to 96 days, and changes in ST-T returned to normal. (4) The contrast of the electrocardiograms of one case of paleomyocardial infarction showed V_{1-6} rs, V_5 as Q_R , T_{V5-6} was visibly inverted, P_{II} was elevated by over 2.5 mm, P_{V1-2} was inverted over 2.5 mm. After 3 months of treatment with fluoropiperidyl alcohol of 24 mg/day and 12 electrocardiographic examinations, the condition improved, P returned to normal, T also improved (T_{V5} was slightly inverted, T_{V6} was flat), but the QRS wave group did not change. (5) To compare the effects of the duration of medication upon the electrocardiogram, we compared the electrocardiogram taken 3 hours after medication and the electrocardiogram taken 12 hours after medication and discovered that the former showed a higher ratio of slow heart beat than the latter (12/28 and 2/10). The results showed fluoropiperidyl alcohol could slow down heart beat and they might have been related to the concentration of the blood, but treatment was not affected.

III. Anti-Psychotic Drugs and Thrombosis

Thrombosis and embolic diseases caused by anti-psychotic drugs are rare but the results are serious. Zhao Peilun [6392 0160 4858] reported one male patient 39 years old who was diagnosed as suffering from depressive psychosis and was treated with tardanum at 150 mg/day. After 15 days, the skin of the left lower limb became pale, showing sunken edema. The inner side of the thigh became noticeably painful but localized focal infection was not observed, the lymph node did not swell, the right lower limb was normal, there were no other bodily symptoms, the white cell count was 12,600, the erythrocyte sedimentation rate was 22 mm/hour, bleeding time was 1 minute, blood clotting time was 3 minutes, the coagulase zymogen lasted 17 seconds. Surgical diagnosis indicated deep phlebitis of the lower limb. The patient was given tardanum, ordered to lie in bed, the affected limb was suspended, penicillin and streptomycin were given, and after 10 days, edema and pain lessened, and after 2 months, the patient

basically returned to normal. This type of complications might have been caused by a combination of reduced activity of the patient and anti-psychotic medication causing coagulation of the blood to increase.

IV. Jaundice and the Rise in Glutamic-Pyruvic Transaminase Caused by Anti-Psychotic Drugs

Chen Zhigang [7115 5267 0474] and Ji Zhongfu [0679 0022 1318] reported on 10 cases of jaundice induced by chlorpromazine, 8 cases were males and 2 cases were females between the ages of 23 and 53 years old. In nine cases, jaundice occurred 16 days to 3 months during medication, one case, medication was given for 7 years, each dose was 1.575 mg of chlorpromazine. After 51 days, jaundice occurred. Examinations of liver functions showed a rise in TTT in three cases, positive CFT in one case, 200 units of GPT in one case and higher than 500 units in seven cases. There were three cases of A/G < 1.5:1. The jaundice index was 8 to 80 units. Serum bilirubin count was 1.3 to 9.4 mg percent. Hindrance of liver function and occurrence of jaundice did not show a visible relationship to the dosage of medication.

Examination of 10 cases of liver tissue activity showed such pathological changes of reddening of hepatic cytoplasm, slight focal necrosis and changes in liver cell lipids, accumulation of bile in the hepatic capillary bile duct and hepatic cells and infiltration of cells by inflammation of the hepatic lobule or the duct area, but the degree of damage to the regular hepatic cells was slight, the pathological levels were ($\pm/-$) or ($+/\pm$), and infiltration of hepatic cells worsened as jaundice persisted. This was related to hepatitis induced by chlorpromazine mainly due to damage caused by accumulation and blocking of the capillary bile duct. In four cases, puncture of the liver recurred 1.5 to 2 months after liver function returned to normal, and cases of relaxation of hepatic cytoplasm, acidophilic variation and occurrence of acidophils were observed, indicating that the function of the liver can be normal while true liver cells can still undergo pathological changes in histology.

Continued treatment by perphenazine after occurrence of jaundice and hindrance of liver function was administered in six cases, chlorpromazine in two cases, fluoroperphenazine caparate in two cases. Jaundice was eliminated within 2 months in eight cases, liver function returned to normal in seven cases, and the remaining cases returned to normal after persisting for 3 months. In one case, chlorpromazine was used continually, jaundice receded and liver function returned to normal, but 7 months later, after a total of 53,425 mg was administered, jaundice recurred, the medication was changed to perphenazine and jaundice receded again. After medication of perphenazine stopped for 3 months, chlorpromazine was administered again for 6 days totaling 1,200 mg, and jaundice recurred. Four cases were treated by perphenazine. After the liver function returned to normal, medication was changed to chlorpromazine. Of these cases, GPT rose in three cases and one case showed no change. This indicated that in the continuous administration of anti-psychotic medication, jaundice can recede and liver function can return to normal but recurrence is possible and abnormality of liver function is mostly manifested by a rise in GPT.

Tie Shudong [1586 2579 2639] and Yang Gengxue [2799 2704 1331] observed 120 cases of anti-psychotic medication causing a rise in transaminase. A rise of 100 to 200u in transaminase was found in 74.2 percent of the cases and 200u or more in 25.8 percent of the cases (the norm is 100 units). The rise in transaminase is related to the types of medicine administered. There were 59 cases caused by chlorpromazine, 9 cases caused by trifluorazine, 21 cases caused by fluoroperphenazine, 2 cases caused by perphenazine, 4 cases caused by tardanum, 11 cases caused by fluoropiperidyl alcohol, and the remaining 14 cases were treated with a combination of the above drugs. Rises in transaminase were observed half a month after medication began, but they were not closely related to the dosage. When medication ceased and when medication for the protection of the liver was administered, normalcy returned 1 to 2 months later.

V. Allergic Dermatitis Caused by Anti-Psychotic Drugs

Yang Feixia [2799 7378 7209] reported on 41 cases of allergic dermatitis caused by anti-psychotic drugs. Hospitalized female patients constituted 6.7 percent of patients hospitalized during the same period. There were 32 cases caused by chlorpromazine, the remaining were caused by perphenazine and tardanum. In 31 cases, the allergy occurred within 1 month of medication and in 10 cases, it occurred later than 1 month. In 14 cases, the allergy occurred in spring, 11 cases occurred in summer, 5 cases occurred in autumn, 11 cases occurred in winter, with the highest number of cases occurring in spring. There were 28 cases that manifested scarlet papules, 7 cases manifested reddening of the face accompanied by edema, 5 cases manifested facial redness, 1 case manifested exfoliative dermatitis. There were four cases that were accompanied by a rise in body temperature and hindrance of liver function. Skin rash frequently occurred on the four limbs and the torso symmetrically. In some cases, allergic reactions resulted from chlorpromazine and then perphenazine. In 35 cases, the allergy disappeared within 20 days when treated with liver protecting medicines such as benadryl diphenhydramine, calcium gluconate, injective hydrocortisone, vitamin C, and in 5 cases the allergy disappeared after 21 days. One female patient 23 years old manifested exfoliative dermatitis 23 days after treatment by chlorpromazine began, body temperature rose, the white blood cell count rose, hepatomegaly occurred and GPT rose. Although the patient was subjected to the various treatments described above, new skin rash recurred continuously. She was released from the hospital after 21 days and 2 weeks later her skin condition returned to normal. Four months later she was hospitalized again and although she was not given any anti-psychotic drugs, skin rash recurred again all over her body on the second day, and after she was released again, the skin rash disappeared. This case seems to indicate that environment or air polluted by chlorpromazine may also cause allergic reaction. (Compiled by Jiao Hanqin [4255 3352 0530])

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- A New Representation of the Light Field.....Li Xianshu [2621 0341 2873], Department of Physics, Zhongshan University (513)
- Theoretical Design of an Optical Coordinate Transform SystemPan Shaohua [3382 1421 5478], Institute of Physics, Chinese Academy of Sciences (519)
- The Algorithm and Computer Program for Indexing Hexagonal and Tetragonal Debye-Scherrer Photographs.....Lu Xueshan [7120 1331 0810], Institute of Physics, Chinese Academy of Sciences; Luo Shoumin [5012 4849 3787], Beijing Institute of Aeronautics and Astronautics (525)
- A Study of the Electron Stimulated Interactions of Residual Oxygen-containing Gases with Ni (001) Surface.....Li Risheng [2621 2480 0581], Ren Dagang [0117 1129 0474] and Xie Tian-sheng [6200 1131 3932], all of the Institute of Metal Research, Chinese Academy of Sciences (537)
- Inelastic Scattering Spectra of Thermal Neutrons by Aluminum Hydride $(\text{AlH}_3)_n$Ruan Jinghui [7086 2529 6540], Cheng Zhixu [2052 0037 4872] and Chen Guiying [7115 2710 5391], all of the Institute of Atomic Energy, Chinese Academy of Sciences (541)
- Research Notes
- Dynamic Reflection Property of Ion-implanted Si by CW CO_2 Laser Annealing.....Li Yuanheng [2621 0337 1854], Institute of Mechanics, Chinese Academy of Sciences (544)
- Condition for the Formation of Acoustic Plasmons in MetalsRen Yanru [0117 3601 1172] and Yin Daole [1438 6670 2867], both of the Department of Physics, Beijing University (548)
- The Effect of Electron Irradiation on α -Lithium Iodate Crystal Structure.....Li Fanghua [2621 2455 5478] and Fan Hanjie [2868 3352 4634], both of the Institute of Physics, Chinese Academy of Sciences; Gao Junjie [7559 0193 2638], Tianjin University (554)
- The Room Temperature Section of the Phase Equilibrium Diagram of the Al-Cr-Cu Ternary System.....Chen Rongzhen [7115 2837 6297], Lin Changjing [2651 7022 0403], Li Dexuan [2621 1795 5503] and Zheng Jianxuan [6774 0256 1357], all of the Department of Physics, Guangxi University (558)

The Crystal Growth of BaB_2O_6 , Low Temperature Phase and the Study of Phase Diagrams of Related Systems.....Huang Qing-zhen [7806 3237 6966], Fujian Institute of the Structure of Matter, Chinese Academy of Sciences; Liang Jingkui [2733 2417 7608], Institute of Physics, Chinese Academy of Sciences (564)

The Structure of $\text{Li}_2\text{K}(\text{IO}_3)_3$ and $\text{Li}_2\text{NH}_4(\text{IO}_3)_3$ Crystals..... Liang Jingkui [2733 2417 7608], Wang Chaoguo [3769 2600 2654] and Che Guangcan [6508 1639 3605], all of the Institute of Physics, Chinese Academy of Sciences (572)

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C50: 4008/342

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TANG Zongjian [0781 1350 0313]
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TITLE: "Studies on the Alkaloids of Cyclea hainanensis Merr"

SOURCE: Beijing ZHIWU XUEBAO [ACTA BOTANICA SINICA] in Chinese No 3, May 81
pp 216-221

TEXT OF ENGLISH ABSTRACT: Seven alkaloids have been isolated from the over ground parts of Cyclea hainanensis Merr (Menispermaceae) grown on Hainan Island. Six of them are identified to be (--) curine (I), (++)-4"-O-methylcurine (II), hayatine (III), d-isochondodendrine (IV), α -cyclanoline (V), and a new quaternary alkaloid named α -hainanine (VI) respectively. Alkaloid (VII) is being identified.

Dimethiodide and Dimethochloride derivatives of alkaloids (I)-(III) show neuromuscular blocking activity, but d-isochondodendrine hydrochloride possesses distinct analgesia.

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ORG: WANG Xianrong and WANG Zhaoquan both of the Institute of Medical Sciences, Anhui; LI of the Institute of Medica, Fuyang, Anhui

TITLE: "Studies on the Chemical Constituents of Abelmoschus manihot L. Medic"

SOURCE: Beijing ZHIWU XUEBAO [ACTA BOTANICA SINICA] in Chinese No 3, May 81
pp 222-227

TEXT OF ENGLISH ABSTRACT: The flowers of Abelmoschus manihot L. Medic have a curative effect in the treatment of chronic bronchitis patients and toothache. Five flavonoid compounds have been isolated from the flower of this plant and identified as quercetin-3-robinobioside, quercetin-3'-glucoside, hyperin, quercetin and myricetin, respectively, according to spectroscopic analysis (UV, IR, NMR), preparation of derivatives, acid hydrolysis and determination of physico-chemical constants. The quercetin-3-robinobioside and the quercetin-3'-glucoside had not been isolated so far from Abelmoschus.

AUTHOR: LI Mingjiu [2621 6900 0036]
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TITLE: "FDM Master-group Signal Encoding Equipment"

SOURCE: Beijing TONGXIN XUEBAO [JOURNAL OF CHINA INSTITUTE OF COMMUNICATIONS]
in Chinese No 2, Apr 81 pp 26-35

TEXT OF ENGLISH ABSTRACT: This paper gives a technical introduction to a newly developed piece of equipment for FDM master-group signal encoding. It converts the 300-channel, 60~1300 KHz, FDM signal into 34,368 Kb/s digital signal which is to be transmitted over the third order PCM transmission system.

The level allocation and number of bits for encoding are discussed in line with the noise requirements of this equipment. The methods of selection for sampling rate, output code pattern of the encoder, etc., are described. The constitution of the equipment and test results are also represented. As the high speed sample-hold circuit and the codec are the important components of the equipment, advanced circuit techniques are used for both of them. As the ECL D-type flip-flop has been used as a comparative device in the encoder, the processes of installation and adjustment have been greatly simplified.

[Continuation of TONGXIN XUEBAO No 2, Apr 81 pp 26-35]

Specifications for the design of this equipment include: 2064 KHz for sampling rate, 10 bits for encoding and 61.1 dB mop/CH for noise figures. Their objects have been accomplished as shown by the results of practical measurement.

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TITLE: "L-I Characteristics of GaAlAs/GaAs DH Lasers"

SOURCE: Beijing TONGXIN XUEBAO [JOURNAL OF CHINA INSTITUTE OF COMMUNICATIONS]
in Chinese No 2, Apr 81 pp 45-49

TEXT OF ENGLISH ABSTRACT: We have investigated GaAlAs/GaAs DH lasers, grown by LPE, with stripe geometry structures isolated by proton bombardment. The light output power vs forward current (L-I) characteristics and their temperature dependence have been studied. The L-I curves under different aging times have been investigated. Some DH lasers are still normally stimulated even after 10^4 hours of investigation. Some DH lasers show kink characteristics in their L-I curves. The nearfield pattern and the emission spectrum near kink current are observed. The kink is probably attributable to a non-uniform traverse distribution of Al in the active region.

9717
CS0: 4009/349

AUTHOR: PAN Zuoshu
TENG Jiwen
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WANG Xiaopei

ORG: None

TITLE: "Characteristics of the Aeromagnetic Anomalies and the Earth's Crust Structure in the Tsangpo River"

SOURCE: Nanjing SHIYOU WUTAN [GEOPHYSICAL PROSPECTING FOR PETROLEUM] in Chinese No 2, 5 Jun 81 pp 78-91

TEXT OF ENGLISH ABSTRACT: The Qinghai-Tibet Plateau is a region where tectogenesis and earthquakes are common occurrences, and it comprises its special structure in both the earth's crust and the upper mantle. In order to make clear the relationship between the aeromagnetic anomalies of the southern part of this area and the structure at depth, processing and analysis have been made for the aeromagnetic data obtained. The scale of the airborne magnetic survey is $1:2 \times 10^5$, its precision is $\pm 5\gamma$ and the average flight height is 3 km.

The area under research includes: Gangdise Shan-Nianqing Tanglha Ra Fold System, the Himalayan Fold System, and the dividing line between these two systems, the Tsangpo River Deep Rift Zone (also called the Tsangpo River Collision Zone), which will be discussed in the ensuing paragraph.

[Continuation of SHIYOU WUTAN No 2, 5 Jun 81 pp 78-91]

The magnetic anomaly of this district is caused mainly by the magmatic rock. The magnetization of the acid rock is less than 300×10^{-6} C.G.S.M. For the ultra-basic rocks, its magnetization is about $(1500 \sim 4000) \times 10^{-6}$ C.G.S.M. The anomalies caused by the acid rocks are quite different from those caused by the ultra-basic rocks. The regional magnetic dip is about 44° . Most of the strikes of the anomalies are nearly east-west, so that it makes the ΔT anomalies rather complicated.

AUTHOR: OU Qingxian
WANG Shiku
ZHANG Xiurong

ORG: None

TITLE: "An Experiment on Seismic Regional Survey with Slalom Line and Multiple Coverage"

SOURCE: Nanjing SHIYOU WUTAN [GEOPHYSICAL PROSPECTING FOR PETROLEUM] in Chinese
No 2, 5 Jun 81 pp 100-115

TEXT OF ENGLISH ABSTRACT: Based on an experiment studying a seismic regional survey with a slalom line and multiple coverage in a certain district, rules for the systematic technical requirements and the factors which might affect the slalom technique have been found and summed up. An all-round comparison has been made between the results obtained by slalom line and straight line. It has been definitely proved that the popularization of the slalom technique is now entirely possible. Although the flexibility and adaptability of the slalom technique are above average, it implies that careful considerations and strict requirements for its tailoring layout and data processing could, not in the least, be neglected.

9717

CSO: 4009/347

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TITLE: "The Computation of Ore Reserves in Blocks Using a Computer"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 10-15

TEXT OF ENGLISH ABSTRACT: In designing a mine or an open pit, it is important to divide the orebody into rectangular blocks and to calculate the tonnage of ore reserves in each block. Based on this, a mineralization inventory and a resulting economic model can be built. If done manually, the work will take more time and will often be inaccurate.

This paper describes a simple and quick method to judge the property of each lattice point using a computer, that is, to distinguish to what rock type the corner points of each block belong, and then to calculate the tonnage of various kinds of ores and the volume of waste rock in each block. The author found that it took less time to complete the same computation than with Mara Kosovac's method. The program is written in ALGOL-60 and is applicable to complicated orebody configurations.

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TITLE: "Hemispherical and Truncated Hemispherical Button Indentation Test"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 16-22

TEXT OF ENGLISH ABSTRACT: More than 500 button indentation tests have been carried out in the laboratory of the University of Luleå, Sweden, on samples of dry and wet granite as well as sandstone. Four kinds of button indenters with different geometrical factors, four levels of penetration rates (0.0005 m/s, 0.05 m/s and 5 m/s), applied forces of different magnitudes were used during these tests. The test results reveal that when the penetration rate is lower than 0.05 m/s, hemispherical button indenters with a diameter of 14.3 mm and 10 mm gave the best results for sandstone and granite respectively. At a penetration rate of 5 m/s, the 14.3 mm diameter hemispherical button indenter remained the optimum for sandstone, whereas the truncated hemispherical button indenter gave best results for granite. In addition, the tests showed that only at low penetration rates did water content have a beneficial effect on rock fragmentation: for wet sandstone,

[Continuation of YOUSE JINSHU No 1, 1981 pp 16-22]

160-340 percent more debris by weight was produced compared with corresponding tests on dry sandstone, due to the sandstone's high porosity and ability to contain water. There is no proportional relationship between specific energy and the debris particle size.

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TITLE: "The Identifying Characteristics of Delay Accuracy of Millisecond Detonators"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 23-29

TEXT OF ENGLISH ABSTRACT: Two identifying characteristics used to evaluate the delay accuracy of millisecond detonators, i.e., over-median probability, P_x , and lapping probability, P_{TK} , are suggested in this paper. The identifying formulas of over-median and lapping are also given with the help of the distribution function of maximum deviation. The analysis of the production records of millisecond detonator products of a certain firm showed us that the critical condition of the above-mentioned over-median probability was about 1 percent, and the nonlapping limit to lapping probability P_{TK} was ≤ 0.1 percent.

The identifying characteristics of lapping are more suitable for blasting design, and the identifying characteristics of over-median are preferable for product control in manufacturing firms.

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TITLE: "Numerical Simulation of Ore Drawing"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 30-34

TEXT OF ENGLISH ABSTRACT: A theoretical model of stochastic medium of ore drawing based on the stochastic nature of the movement of broken ore is established in this article. A discussion is made of the ore drawing process, which is just like the diffusion process of voids diffusing upward from the chute, and the governing partial differential equation is of the parabolic type.

Laws of ore drawing from a single chute are discussed in detail in this article. The principles of the numerical simulation of the contact surface of broken ore and waste during ore drawing from multiple chutes are also described. Examples are given to illustrate the implementation of numerical simulation of ore drawing from multiple chutes and the data on the movement of the contact surface of broken and waste, quantity of drawn ore, ore loss and the shape of drawn-ore body are presented.

In order to generalize the given method to include axisymmetrical two-dimensional problems, the pertinent equations of transformation are given in this article and the methods used to solve ore drawing problems with arbitrary boundary conditions are also described here.

[Continuation of YOUSE JINSHU No 1, 1981 pp 30-34]

The method of numerical simulation of ore drawing given not only will benefit the further research of the theory of ore drawing, but also will provide a rapid, correct and simple method for the use of electronic computers in the fields of design and management of modernized mines.

AUTHOR: LI JI [2621 1323]

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TITLE: "Separation of Tin Ore Slimes by Using the Centrifugal Separator"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 36-38

TEXT OF ENGLISH ABSTRACT: Gejiu city in Yunnan Province is the principal tin ore district in China. The overwhelming majority of ores in this district includes refractory alluvial placer tin ores. Separation of tin ore slimes in the district by use of the centrifugal separator developed by the Yunnan Tin Mining Company can achieve good results. As far as tin ore slime is concerned, throughput is 30~35 metric tons per unit per day. When treating tin ore slime assaying 0.2~0.6 percent Sn, a concentrate of concentration ratio 2.5~3.0, with a recovery of 80~85 percent, can be obtained. For size fraction $+10\mu$, recovery is in the range of 75~90 percent; for size fraction -10μ , recovery of 35~40 percent is achieved.

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TITLE: "The Spiral Chute and Its Separation Practice"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 39-43

TEXT OF ENGLISH ABSTRACT: The specific structure, technological characteristics and operation principle of the spiral chute are briefly described in the paper, emphasis being laid on its practice of separating hematite, tin, tungsten, tantalum and niobium ores and other heavy minerals.

The spiral chute has spiral segments with cubic-parabolic cross sections, and during its operation neither midway cut-off of the concentrate nor adding of wash water are needed. It is composed of glass fiber reinforced plastic segments with wear resistant lining, which results in a light but reliable and durable design and in an exact configuration. Its feed distributor and product dischargers are all of a simple structure and are easy to control.

The spiral chute has been proved suitable for separating fine-grained heavy minerals, effective separation size ranging from 0.3 to 0.03 mm. Treating the Anshan type fine-grained and low-grade hematite ore by the commercial four-start glass fiber spiral chutes, $\phi 1200$ mm, can obtain after one stage primary separation and one cleaning a concentrate grading 65-67 percent iron, with operation recovery

[Continuation of YOUSE JINSHU No 1, 1981 pp 39-43]

74-76 percent. This type of spiral chute can also be used, with a smaller investment and faster economic effect, to recover iron values from tailings discarded by existing iron concentration plants. The chute is expected to be promising for treating the ores in which a considerable specific gravity difference is inherent between the valuable minerals and the gangue, such as tin, tungsten, tantalum and niobium ores and other heavy minerals.

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TITLE: "A Study of Rejection of Greisenized Granite by the Photoelectric Sorting Method"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 43-49

TEXT OF ENGLISH ABSTRACT: The application of the photoelectric sorting method to mineral processing has made some progress at some tungsten mines in China. In recent years, the method has been tested for quartz veined tungsten ore in leuco granite rock body and proved successful.

Different kinds of minerals have different optical properties. The photoelectric sorting method is a separating process which changes the difference of certain optical properties of minerals into the difference of electronic information. This diffuse reflection method is the most widely used technique in sorting minerals. It can be subdivided into three types: monochromatic, bichromatic and polychromatic sorting methods. Generally, the selection of the processes is dependent upon the extent of the differences in the minerals' diffuse reflectivities.

The key to use of the photoelectric sorting method lies in the conversion of the difference in mineral optical properties into sufficient difference of electron information. The detecting system, composed of light source, background, lens and

[Continuation of YOUSE JINSHU No 1, 1981 pp 45-49]

light sensor, can do the job, which is called the "eye" of the sorting machine. Consequently, the design of the detecting system depends on sorted minerals and should be done meticulously. It is important to select the background because its signal is the basis for sorting minerals. It is especially important to precisely select the photoelectric signal of the background for minerals which are similar in color.

The adjoining rock of quartz veined tungsten ore is granite. The run-of-mine ore consists of granite, quartz and wolfram blocks. The size of the diffusively reflective photoelectric signal of granite (barren rock) is between that of wolfram block and quartz block. The color, which has nearly the same diffuse reflectivity as that of granite, is selected as the background and, by applying the diffuse reflection sorting method, it is possible to separate granite from quartz and wolfram block. This paper describes the basic principle and merits of the sorting process and presents some test results. The treated size fraction was $-35 + 23$ μ m. The run-of-mine ore was composed of ore bearing quartz vein, barren metamorphic rock and granite. The results achieved were as follows: the rejecting rate of barren rock was over 92 percent; the separating rate of ore bearing quartz vein was in excess of 86 percent; the content of quartz vein in tailings was below 3 percent.

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TITLE: "Investigation of L-P-CF Process"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 50-53

TEXT OF ENGLISH ABSTRACT: The L-P-CF process developed by the authors consists of: 1) leaching refractory copper ore or middling by H_2SO_4 , 2) changing Cu^{++} into colloidal copper sulfide precipitate, and 3) carrier-flotation by using a high-grade Cu concentrate for adsorbing and carrying the fine copperish particles. Experiments on several kinds of Cu ores have been made and quite satisfactory results have been obtained in our laboratory. For example, an ore sample from Dongchuan Copper Mine was floated to yield a high-grade concentrate and a middling. Then, the middling was treated with the L-P-CF process, using the concentrate as carrier. A final concentrate grade of 22.5 percent Cu and a recovery of 81.5 percent were achieved, which exceeded those obtained by conventional flotation processes by 4-5 percent and 7-8 percent respectively. Another sample assaying 2 percent of Cu from the Dayie Copper Company yielded a concentrate with an assay of 24.9 percent Cu and recovery of 81.2 percent through the L-P-CF process, while

[Continuation of YOUSE JINSHU No 1, 1981 pp 50-53]

the conventional flotation process only gave a concentrate grade of 15 percent Cu and a recovery of 35 percent.

It is believed that the L-P-CF process may have some advantages over the other chemical processes for Cu ores, i.e., 1) it does not involve any solid-liquid separation in the process; 2) no extractants, ion-exchangers or sponge iron are needed; 3) flotation is performed in neutral or weak acid pulp; 4) precious metals, such as Au and Ag, can be recovered together with Cu; 5) flotation process can be greatly improved by using Cu concentrate as carrier, which is available to any plant and does not need regeneration and reuse; 6) using CaS as a precipitant of Cu^{++} and CaCO_3 for neutralizing free acid may provide favorable conditions for treatment of waste water.

AUTHOR: XING Yongqing [6717 3057 3237]

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TITLE: "Theory and Study Methods of Crystal Breakup"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 54-58

TEXT OF ENGLISH ABSTRACT: In investigating the kinds and quantities of fresh surfaces exposed after breaking and the feature of ions exposed on split crystal surfaces, we have calculated the amount of energy consumed under external force and have learned about the breaking of various crystal faces based on unit cell energy. We have established an advanced technology to replace theoretical analysis and good results have been obtained.

By using the calculating equation of the force between two parallel crystal faces in the unit cell and the energy consumption required to counteract this force, real or possible crystal faces existing in galena have been counted. Under external force, the kinds and probabilities of split faces are $(100) > (011) > (111) > (012) > (112) > (013) > (113) > (023) > (014)$.

According to the principle of producing diffraction under the action of the X-ray on the split faces, we have examined all kinds of minerals on a diffractometer. For example, the following are the results obtained from the galena in Pb-Zn

[Continuation of YOUSE JINSHU No 1, 1981 pp 54-56]

concentrate from the Pankou Mine:

Kind of split faces:	(100)	(011)	(111)	(012)	(113)	(133)	(112)	(115)
quantity (percent):	23.51	22.78	15.17	11.78	10.78	6.62	6.08	3.39

Obviously, the measured values are quite similar to the theoretically calculated values. Therefore, the application of the X-ray diffractometer in this research work is favorable.

Results from a quantity of real examination and theoretical analysis showed that the form of crystal breakage is strictly controlled by the internal crystal structure. The internal crystal structure is divided into 230 space groups. There are also 230 types of fresh faces exposed after crystal breaking and 230 basic forms of distribution. Some of the faces exhibit a few exceptions when dislocations, defects, impurities or distortions in crystal lattices exist.

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ORG: Shenyang Smelter

TITLE: "On Technical Development of Old Nonferrous Metallurgical Plants"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 59-61

TEXT OF ENGLISH ABSTRACT: At present the main technical development problems that face the old nonferrous metallurgical plants in China are to minimize the environmental pollution from flue gases, waste waters and residues from metallurgical processes, and to maximize the efficiency of energy utilization in metallurgical operations, and to increase the profit in order to provide the requisite capital for reforming old plants.

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et al.

ORG: None

TITLE: "Sorption of Gold (I) in Aqueous Thiourea Solutions on Sulfur-containing Ion Exchange Resins"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 62-66

TEXT OF ENGLISH ABSTRACT: Two types of sulfur-containing ion exchange resins have been prepared by the reacting of chloromethylated divinylbenzene styrene copolymer with suitable reagents. One of them contains the thiourea group and the other dithiocarboxylic acid. Their formations are explained by infrared spectrum data.

The exchange sorption properties of gold (I) from acidic aqueous thiourea solutions on the ion exchange resins are also reported.

AUTHOR: None

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TITLE: "Hydrometallurgy of Antimony"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 67-72

TEXT OF ENGLISH ABSTRACT: The current process for hydrometallurgy of antimony is alkali-leach and electrowinning. It includes the following essential unit operations: leach, electrolytic deposition, refining, crystallization and dehydration of sodium sulfide and purification of the anolyte. The pilot plant experiment (about 40 tons of electrolytic antimony a year) indicates that the extraction of antimony by sodium sulfide leaching is over 99.5 percent; the current efficiency of electrolysis ranges from 82 to 85 percent in diaphragm cells. The cathode antimony, just through a simple melting procedure to eliminate the adhered sodium salts as skimmings, can be turned into antimony ingots with above 99.6 percent purity. These are easily refined into first-grade products. As for recovery of sulfur, $\text{Na}_2\text{S} \cdot 9\text{H}_2\text{O}$ crystals can be separated from the spent cathode-electrolyte by refrigeration and crystallization. The crystals are subjected to further dehydration, turning into industrial products with 63.5 percent purity. The sulfur recovery is about 80 percent. The mother liquor is pumped back to the leach circuit.

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Sodium sulfate is accumulated in an anode-electrolyte, interfering with further electrowinning of antimony. Consequently, a purification procedure has to be carried out. Mixed sodium salts in which sodium sulfate predominates are separated as by-products and may be used as raw materials in the manufacturing of glass or in some chemical plants.

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YIN Caiqiao [1438 2088 9348]
GAN Zhaoping [3927 3564 1627]
ZHANG Guodong [1728 0948 2767]

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TITLE: "Comprehensive Recovery of Nickel, Cobalt and Iron from Albanian Laterite"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 73-81

TEXT OF ENGLISH ABSTRACT: The treatment of Albanian laterite by reduction-ammoniacal leaching process is reasonable and feasible, and the objective of comprehensive utilization of the elements nickel, cobalt and iron has been achieved.

In a series of commercial experiments for a scale of 84 T/day, a high efficiency two-stage fluidized bed roaster was successfully used for reduction roasting; three-stage countercurrent leaching and fluidized washing were conducted and good extractions for nickel and cobalt were obtained. According to the characteristics of the calcines, the phase change and phase composition of the soluble iron during ammoniacal leaching were rationally controlled and the recovery of iron concentrate was achieved by the simple magnetic separation process. In the purification of nickel and cobalt, ammonium sulfate was adopted for the dissolution operation and the oxydrolisis was performed at low temperatures. The economic aspect was,

[Continuation of YOUSE JINSHU No 1, 1981 pp 73-81]

therefore, satisfactory. High-purity nickel powder and cobalt powder were directly produced by the hydrogen reduction technique, a technically advanced method.

Based on the results of these experiments, in 1978 a nickel and cobalt extraction and purification plant with a capacity of 900,000 T/year laterite has been completed in Albania.

AUTHOR: WANG Wenshao

ORG: None

TITLE: "Survey of Shenyang Smelter"

SOURCE: Beijing YOUSE JINSHU [NONFERROUS METALS] in Chinese No 1, 1981 pp 87-90, 66

TEXT OF ENGLISH ABSTRACT: The Shenyang Smelter, which is located in Shenyang, the well-known industrial city of northeastern China, is one of the most important nonferrous metallurgical plants in the PRC. Shenyang is the capital of Liaoning Province, where transportation is very convenient by the railway, and it is connected directly with the famous seaports, Dalian and Tianjin.

The smelter was set up in 1936, but at that time it only produced copper and lead on a very small scale. Since the founding of the PRC in 1949, the smelter has developed rapidly in accordance with the national economic development program. During recent years a number of advanced metallurgical techniques and devices have been adopted in order to attain top quality and high output. For example, the raw materials processed are utilized fully and the energy consumed during operation is economized as much as possible, etc.

The smelter is now engaged in a program to accelerate its technological development including prevention of environmental pollution caused by emissions, effluents and residues discharged from operations.

[Continuation of YOUSE JINSHU No 1, 1981 pp 87-90, 66]

In comparison with 1949, the annual output and total output value have correspondingly increased about 43 and 32 times, and the variety of products has increased to more than 20, with the quality of products reaching an advanced level comparable to those of similar plants in the world. Now the smelter can produce the following four categories of products:

Base metals--copper, lead, zinc, antimony, bismuth, cadmium, nickel, cobalt and antimony-lead-arsenic alloy;

Rare and noble metals--selenium, tellurium, indium, germanium, gold, silver, platinum and palladium;

Chemical compounds--copper sulfate, nickel sulfate, cobalt sulfate and zinc oxide;

High-purity metals and semiconductor compounds--

(a) Metals of high purity, up to 99.999 percent, including Ag, As, Au, Bi, Cd, Co, Cu, Ga, In, Ni, Pb, Sb, Se, Sn, Te and Zn;

(b) Ultra-pure metals or non-metals up to 99.9999 percent including As, Cd, Ga, In, Te and S,P;

(c) The single crystals of semiconductor compounds, including GaAs, CdTe, ZnSe and CdS with large diameters.

In addition, the smelter can also produce the plate, sheet, foil, bar, globe and powder of ultra-pure metals and their alloys according to the requirements specified by the customers.

Copper sulfide concentrates and lead sulfide concentrates used as raw materials are largely supplied by the mines situated in northeastern China. The zinc calcine used

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as raw materials for recovery of zinc is provided by the zinc smelter, Huludao Zinc Plant. Classified according to their products, the major workshops here may be divided into five running systems, i.e., copper, lead, zinc, sulfuric acid and rare and noble metals.

The copper metallurgical process adopted consists of roof-enclosed blast furnace smelting, converter blowing and electrolytic refining. The purpose of the roof-enclosed blast furnace is to handle low grade raw copper concentrates and to discharge directly blast furnace slag containing less than 0.2 percent Cu. At the same time, the furnace gas containing about 3.5 to 4 percent sulfur dioxide is mixed with the converter flue gas before being delivered to the sulfuric acid system. A specific process known as the "dry cleaning process" is employed in this sulfuric acid system to make concentrated sulfuric acid. At present, the recovery of sulfur oxides from the tailing gas is under development.

The production process of lead consists of sintering--blast furnace smelting--Betts electrolytic refining. During recent years a number of technological innovations have been practiced to attain better effects both technically and economically. For example, for preparation of furnace charge, some small automatic mechanized devices have been designed and installed. These reduce the manual labor to a minimum and prolong running time. Based on repeated experiments and operating experience, a continuous decopper furnace of lead bullion has been successfully built up, with the result that both operations, i.e., the decopperization of lead bullion and the

[Continuation of YOUSE JINSHU No 1, 1981 pp 87-90, 66]

treatment of dross, which up to now had to be separately handled in separate furnaces can be carried out simultaneously in one furnace. Therefore, the recovery of lead is increased and the consumption of fuel is reduced. In 1974, the periodic reverse current for electrorefining process of lead was adopted instead of the direct current method. It has been proved that the former is superior to the latter as far as the quality of cathode deposit is concerned. In the field of mechanization research, two automatic operating lines of preparing lead-anode and lead-cathode have been established successively. The former can automatically do the casting, demolding, pressing and arranging of a row of lead-anode in the predetermined order. The latter can carry out the following actions in sequence: condensation of lead sheet out of molten lead, cutting of lead condensate, insertion of a conductor bar, pressing them flat and arranging them in a row.

Extraction process of the zinc includes the following stages: the two-step leaching of zinc calcine, the batch purification of the leaching solution with zinc powder and arsenic oxide in two stages, the electrowinning of zinc under medium current density and medium acidity, the melting of cathode deposit into zinc slab in melting furnace, and, at the end, mechanized stacking of zinc slab.

Moreover, the following new technical problems have been studied: 1) Instead of the traditional roasting process, the dust of zinc oxide is washed with the solution of sodium carbonate to remove chlorine and fluorine contained in it. 2) The leaching residue of zinc calcine is treated by the Jarosite process in the pilot plant scale

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and a way of utilization of the waste from the Jarosite process is established. 3) The sampling and titrating apparatus for free sulfuric acid content or total ferric content in the batch leaching operation are studied and the different controlling valves which are most suitable for transportation of pulp or solution are improved and further developed. 4) The anode slime discharged from both the copper and the lead electrorefining processes is handled in a separate workshop to recover some rare and noble metals as mentioned above.

In addition, there is a nonferrous metallurgical institute here. The following subjects are now being studied: the utilization of flue gas containing a lower content of oxides of sulfur; the removal and recovery of arsenic oxide from smelting furnace gas; the research on reasonable constituents of lead blast furnace slag; hydro-metallurgy of materials containing lead; the treatment of harmful effluents, emissions and residues; the extraction of cobalt from residue containing zinc and cobalt; the comprehensive extraction of valuable constituents from copper dust or lead dust collected in an electrostatic precipitator; the reduction of electric energy consumption during electrowinning of zinc, etc.

9717

CSO: 4009/278

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ORG: None

TITLE: "The Realization of the International Practical Temperature Scale Above the Gold Point with a High Temperature Standard Photoelectrical Comparator"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 2, 1981 pp 81-88

TEXT OF ENGLISH ABSTRACT: This paper briefly describes a method for the realization of the IPTS-68 above the gold point in which a photoelectrical comparator is used as a high temperature standard instrument. The error analysis, the structure of the comparator, the realization of the freezing gold point, the calculation of the effective wavelength and the method of extending the temperature scale are also given. The uncertainty is $\pm 0.07^{\circ}\text{C}$ at the gold point and $\pm 1.2^{\circ}\text{C}$ at 2000°C .

AUTHOR: HE Guowei

ORG: None

TITLE: "The General Synthetic Methods for Estimating the Errors of the Measuring Instruments or Systems"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 2, 1981 pp 89-98

TEXT OF ENGLISH ABSTRACT: This paper presents some new synthetic methods for estimating the errors of the measuring instruments or systems. The classical Welch's approximation method has been generalized for synthesizing the precision and residual systematical errors after statistical adjustment when their degrees of freedom are different. The one-sided γ -confidence intervals for the total precision, the total residual systematical error and the uncertainty are given. According to the theoretical analysis, the results presented in this paper may extend the range of applications of the previous research where the degrees of freedom of the error sources should be equal to each other.

AUTHOR: WANG Hanchun

ORG: None

TITLE: "The Frequency Response Measurement of the Human Ear and the Calibration of Earphones Used in Audiometry"

SOURCE: Beijing JILIAN XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 2, 1981 pp 99-104

TEXT OF ENGLISH ABSTRACT: The frequency response of the human ear measured for the right and left ears of 10 subjects under "unsealed" (or natural seal) and "closed seal" conditions is described, and an equivalent electrical network is analyzed. In the equivalent electrical network the acoustical mass of acoustic leaks is very important for impedance over the range from 250 to 1000 Hz under the leakage conditions. The difference of the frequency response of the human ear measured under closed seal conditions among different ethnic groups is very small after the comparisons are made. This work illustrates that only if the closed seal method, with a standard high impedance earphone, is used in measuring the real ear frequency response, can the artificial ear used in audiometry simulate these closed seal curves.

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TITLE: "A Multiplex Data-acquisition and Data-processing System Using a Micro-processor"

SOURCE: Beijing JILIAN XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 2, 1981 pp 105-116

TEXT OF ENGLISH ABSTRACT: Through a study of an automatic-testing and data-processing system for the properties of hydraulic elements, e.g., oil pump and oil motor, this paper briefly describes the operation principle of this system with a microprocessor. The hardware and software for this system are also given. This is a general automatic-testing system, which can also be applied to the property-testing and data-processing of electrical machinery, diesel engines and some other equipment by properly changing the primary transducer and input conversion circuit used in this system.

AUTHOR: LING Shankang [5677 0810 1660]
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TITLE: "The Error Distribution in the Calibration of the Standard Platinum Resistance Thermometer (273.15 - 13.81 K)"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 2, 1981 pp 117-124

TEXT OF ENGLISH ABSTRACT: Platinum resistance thermometers are widely used as precision measuring instruments in thermometry. It is of practical significance to calculate the error distribution of this instrument in the whole range of 273.15 to 13.81 K.

The authors have studied the calculation method and calculated with a computer. The results are excellent. In the range of 90.188 to 13.81 K there is good agreement with Furukawa's curve. In addition, the error distribution in a more extended range (273.15 - 13.81 K) is given.

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TITLE: "The Absolute Measurement of the Activity of β Particle Emitters with Liquid Scintillation Counting"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 2, 1981 pp 125-130

TEXT OF ENGLISH ABSTRACT: This paper describes a new extrapolation method using liquid scintillation counting for standardization of β particle emitters. The efficiency of a liquid scintillation detector may be varied by placing different optical filters between the vessel and the phototube.

Taking the zero probability for β particle detection into account, it is shown that the count rate varies monotonously with the anode current and tends to the inverse anode current when approaching zero. Measurements using four different β emitters confirm the validity of this method.

* Members include Song Li [1345 7812], Wang Zaiyong [3769 6528 0516], Fang Yusheng [2075 3768 3932], et al.

AUTHOR: LIU Zhongwei
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ORG: None

TITLE: "The Calculation of Roundness and Cylindricity Deviation with Successive Approximation"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 2, 1981
pp 131-139

TEXT OF ENGLISH ABSTRACT: In the ISO standard, it specifies evaluating the roundness and cylindricity deviation with the minimum zone method. In this paper a calculating method which conforms to the standard is proposed. Through the calculation of a given data group, the authors indicate uniqueness of the cylindricity deviation and the simplicity of the distribution of the difference of the maximum and minimum radius exist in fact. According to the successive approximation method, the computer, starting from an original value, can find out the cylindricity deviation of the given group data automatically. If it starts from a few different original values, the calculated result will be the same. Since this calculating method only requires measuring the relative position of the points in the surfaces of parts, it is not necessary to align the object to be parallel to one of the coordinate axes of the measuring instrument.

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TITLE: "International Comparison of Methane and Iodine Stabilized Lasers between NIM and BIPM"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 2, 1981
pp 140-145

TEXT OF ENGLISH ABSTRACT: The methane and iodine stabilized lasers were compared between the National Institute of Metrology of China (NIM) and the Bureau International des Poids et Mesures (BIPM) in April, 1980. The results of the comparison are excellent: the mean frequency difference of the methane stabilized laser is ± 0.56 kHz (corresponding to $\pm 6.4 \times 10^{-12}$), the standard deviation is ± 1.29 kHz (corresponding to $\pm 1.5 \times 10^{-11}$); the mean frequency difference of the iodine stabilized laser is $+13.8$ kHz (corresponding to $+2.9 \times 10^{-11}$), the standard deviation is ± 4.5 kHz (corresponding to $\pm 0.95 \times 10^{-11}$).

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TITLE: "Some Problems Concerning Dynamic Calibration and Evaluation of Dynamic Behavior for Pressure Transducers"

SOURCE: Beijing JILIAN XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 2, 1981 pp 146-152

TEXT OF ENGLISH ABSTRACT: In this article the author proposes the following ideas concerning dynamic calibration and evaluation of dynamic behavior for pressure transducers according to simple analysis of linear system and experience in practice: (1) The step pressure is a more ideal pressure source for dynamic calibration. A shock tube can be used for standard dynamic pressure calibration equipment except for micro-pressure transducers. (2) The major dynamic behavior of the pressure transducers includes rise time, over-modulation amount, vibration frequency or resonance frequency and shock acceleration sensitivity. (3) The calibration of the pressure transducers can employ the dynamic calibration method combined with static calibration (it is not necessary to be calibrated dynamically for all ranges). In addition, it should be pointed out that the concept "dynamic sensitivity" cannot be used to completely comprehend the dynamic behavior of pressure transducers.

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TITLE: "New Application for Eva-mode Resonator to RF-Conductivity Measurements of WBCO"

SOURCE: Beijing JILIAN XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 2, 1981 pp 153-156

TEXT OF ENGLISH ABSTRACT: This paper presents a new idea for the measurements of RF-conductivity of the WBCO (waveguide below-cutoff), using the evanescent-mode resonators. In this technique, inductance is represented by short sections of a circular H-mode waveguide, with some appropriate capacitance elements, which form the very compact resonators. The electric stored energy is confined to a small volume surrounded by a large volume, which contains the magnetic stored energy. Performance competitive with existing resonators is achievable in greatly reduced volume. We may use eva-resonators to realize surface resistance measurements with an unloaded Q_0 of 1×10^3 at 30 MHz in a suitable construction.

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ORG: National Institute of Metrology

TITLE: "Two Important Items of Progress in the Research of the Natural Electrical Standards"

SOURCE: Beijing JILIANG XUEBAO [ACTA METROLOGICA SINICA] in Chinese No 2, 1981 pp 157-162

TEXT OF ENGLISH ABSTRACT: In this paper two important instances of progress obtained abroad recently in the field of natural standards of electrical units are described. The first is that a new physical effect in semiconductor surface physics, the Klitzing effect, has been discovered. It can be used to establish the natural standard of resistance. The second is the Josephson device with many junctions in series at zero current bias, and thus a great improvement in precision for the natural standard of voltage based on the AC Josephson effect is expected.

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CSO: 4009/291

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TITLE: "Multispectrum Interpretation of the Landsat Photograph Covering the Area of the Qiongzhou Strait"

SOURCE: Beijing HAIYANG YU HUZHAO [OCEANOLOGIA ET LIMNOLOGIA SINICA] in Chinese Vol 12 No 3, 1981 pp 210-224

TEXT OF ENGLISH ABSTRACT: The reflectance characteristic of a ground feature is the basic criterion for its discrimination on aerospace imagery. On the Landsat photograph covering the area of the Qiongzhou Strait, along four lines running north-south, we chose 50 sample points lying equal distances from each other. We measured with a scanning micro-densitometer the respective density of each sample point on the four negatives corresponding to Band 4, Band 5, Band 6 and Band 7 respectively. Thus we got four density values for each point (N_4 , N_5 , N_6 and N_7) and plotted them against the spectral band number to form the reflectance curve of that point. As similar objects on the ground have similar reflectance characteristics, we can use the latter as a criterion for classifying the ground features at these 50 points. The procedure is, first using the cluster analysis statistical method, to calculate the distance between the different sample points and then group them according to the closeness of their spectral characteristics. The calculation was carried out with a simple electronic calculator. We found that these 50 sample points fell on the following types of ground features: seawater of

[Continuation of HAIYANG YU HUZHAO Vol 12 No 3, 1981 pp 210-224]

different turbidity; platforms of lava flows extruding in different times; different terraces of accumulation; sand spits; beach ridges; river beds, etc.

At the western end of the Qiongzhou Strait, a tidal delta spreads like a fan. It appears clearly on the Band 5 Landsat photograph, but the regression analysis shows that there is no strict correlation between the density values and the depth values over the tidal delta. This is because the density values reflect directly the turbidity of the water, which is a function of both the intensity of the waves and the depth of water. Though the water is often turbid over the shoals where the waves touch the bottom, during offshore winds the nearshore zone might be free from waves so that the water remains limpid. Such was the case along the western coast of the Leizhou Peninsula when the photo we used was taken. On the Band 5 photo the near-shore zone of that coast appears dark.

The spectral characteristic of a submerged reef flat is similar to that of clear water. The only difference is that the density values on Band 4 and Band 5 negatives of the former are higher than those of the latter. This is the result of ecological conditions of coral reefs.

Bare silty mud tidal flat and mangrove forest tidal flat can be differentiated by comparing their tonal difference on negatives of different spectral bands.

[Continuation of HAIYANG YU HUZHAO Vol 12 No 3, 1981 pp 210-224]

Both the eastern coasts of the Leizhou Peninsula and Hainan Island are straightened by heavy accumulation. There are large-scale barrier beaches with silty mud tidal flat behind them. On these tidal flats mangrove forests are growing. Along the western coasts the coastlines are more indented and more stable. Coral reefs are widespread there.

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CSO: 4009/345

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TITLE: "Preliminary Report on the Development of a Bioassay for Detection of
Mutagens in Seawater"

SOURCE: Qingdao SHANDONG HAIYANG XUEYUAN XUEBAO [JOURNAL OF SHANDONG COLLEGE OF
OCEANOLOGY] in Chinese Vol 11 No 2, 1981 pp 74-79

TEXT OF ENGLISH ABSTRACT: Although air and water pollution on land has drawn a great deal of attention, seawater pollution has not yet been dealt with sufficiently. Offshore pollution along the coast of many industrial nations from oil spills, effluence of factories and power plants is of much greater magnitude than that on land. The present study intends to develop an efficient bioassay which will be reliable in detecting mutagens in polluted seawater. Three plant species have been used to test for chromosome breakage or genetic damage inflicted by known mutagens. They are: gametophytes of Laminaria japonica, a fast growing thallus of brown alga; Platymonas subcordiformis, a single celled, green alga; and Spartina englica, a grass which grows on the intertidal zone of the coast. During

[Continuation of SHANDONG HAIYANG XUEYUAN XUEBAO Vol 11 No 2, 1981 pp 74-79]

the preliminary stage of this study, X-rays and ultraviolet light were used as mutagens for their well-known chromosome breaking ability and dose requirement to treat Laminaria gametophytes and Platymonas. Sodium azide (NaN_3), a well-known mutagenic chemical, was used to treat root meristems of Spartina and Laminaria. Preliminary results indicate that micronuclei (MCN) can be induced in male gametophytes when 400-500 R of X-rays are applied. Ultraviolet light at about 2×10^5 erg/cm² induced MCN in Platymonas and the MCN frequency of that treated was about four times as much as that of the control. Sodium azide could induce chromosome damage in the form of fragments and laggards in the mitotic metaphase and anaphase figures. Among these three plant species, Platymonas seems to be more promising for developing into an efficient bioassay for seawater pollution detection. Other plants will be chosen for similar tests.

* Collaborated research between Shandong College of Oceanology and Western Illinois University, with partial assistance of the Institute of Oceanology, Chinese Academy of Sciences, under the program of the Committee on Scholarly Communications with the PRC, U.S. National Academy of Sciences.

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TITLE: "A Preliminary Study on the Use of Tradescantia Micronucleus Technique in Monitoring Marine Pollution"

SOURCE: Qingdao SHANDONG HAIYANG XUEYUAN XUEBAO [JOURNAL OF SHANDONG COLLEGE OF OCEANOLOGY] in Chinese Vol 11 No 2, 1981 pp 80-85

TEXT OF ENGLISH ABSTRACT: The Tradescantia micronucleus (MCN) technique devised by Professor T. H. Ma has been effectively used in detecting pollutants in the air and freshwater. The present writers have applied this technique to monitoring marine pollution and have thus obtained some encouraging results. The success was mainly due to the dilution of seawater to a certain extent (25-50 percent) so that the Tradescantia inflorescences could remain alive during the time required for the experiment. One hundred percent seawater could be used also, but with less satisfactory results.

The present study revealed that some parts of the seawater in Jiaozhou Bay were heavily polluted. The standard seawater itself could not induce the micronucleus. the tap water in Qingdao was tested and its quality was seen to be quite good, for no significant amount of mutagens was detected.

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CSO: 4009/342

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TITLE: "On the Relation of the λ -type Structure to Oil and Gas Migration and Accumulation"

SOURCE: Jiangling SHIYOU YU TIANRANQI DIZHI [OIL AND GAS GEOLOGY] in Chinese
Vol 2 No 1, Mar 81 pp 11-17

TEXT OF ENGLISH ABSTRACT: The λ -type structure is one of shear form. The authors, proceeding from a study of some oil-bearing λ -type structures, such as Zhongba, Sichuan, elucidate the characteristics of oil and gas distribution in the λ -type structure, analyze the tectonic stress field of the λ -type structure in connection with photoelastic experiments, discuss the effects of the stress activity on the migration and accumulation of oil and gas and the inner cause of controls, analyze the fundamental geological conditions for the formation of the oil-bearing λ -type structure, and approach the controlling effects of the λ -type structure on the distribution of oil and gas. In this paper an attempt is made to further reflect the major features of the control on oil and gas by the shear structure from an aspect such as the λ -type structure.

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TITLE: "The Relation between Petroleum and Geotherm in the Dongtai Depression, Northern Jiangsu"

SOURCE: Jiangling SHIYOU YU TIANRANQI DIZHI [OIL AND GAS GEOLOGY] in Chinese
Vol 2 No 1, Mar 81 pp 18-27

TEXT OF ENGLISH ABSTRACT: In this paper, theoretical calculations of the geothermal data on 55 wells in the Dongtai depression are made. The results obtained are identical to those obtained from measurements of the organic geochemical evolution. It has been established that the range of the threshold temperatures for oil generation in the area is between 90-166°C (i.e., mature sphere), and found that the distribution of the oil-gas fields in the area is closely related to the anomalous area with geothermal gradients ranging from 3.5 - 4.0°C per 100 M. This shows that the anomalous area is the most favorable area for oil-gas concentration.

The threshold oil-generating depths calculated from the above-mentioned threshold oil-generating temperatures in the area are between 2000 and 4000 M. The prediction and evaluation of the oil-gas prospects in the area show that there seems to still be considerable potential oil and gas within the threshold depths in the area that have not been struck by drill holes and that large amounts of condensing oil and gas below the threshold depth remain to be discovered.

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TITLE: "Genetic Types of Middle Carboniferous Carbonate Tidal-flat Breccia Dolomite in Eastern Sichuan and Its Relation to Oil and Gas Concentration"

SOURCE: Jiangling SHIYOU YU TIANRANQI DIZHI [OIL AND GAS GEOLOGY] in Chinese Vol 2 No 1, Mar 81 pp 28-36

TEXT OF ENGLISH ABSTRACT: The Middle Carboniferous tidal-flat breccia dolomite was formed by diagenesis of carbonate sediments embracing subaerial exposure, penecontemporaneous evaporation dolomitization and desiccation of the deposits after their deposition. The process was accompanied by desiccation cracking and desiccation tearing, and thus the sediments were broken into fragments which later were eroded by rains and tides, and finally deposited in situ. Another hypothesis is that after the sediment was deposited at shallow depths, its superficial layer was cracked upon drying, leading to desiccation, dewatering and contraction of the inner part; later it was subjected to leaching and solution by fresh water, and then the rock was formed.

From analyses of the rock types of the constituent angular fragments, textures and structures in the rocks and strata, fossil assemblages and diagenetic changes of the sediments, it can be recognized that the breccia dolomite is mainly developed in three subenvironments, i.e., supratidal algal mud flats, intertidal algal mud

[Continuation of SHIYOU YU TIANRANQI DIZHI Vol 2 No 1, Mar 81 pp 28-36]

flats and tidal channels. It is also distributed in intertidal lakes at the drying-up stage. Six genetic types of rock may be recognized: desiccation-tear breccia dolomite, desiccation-crack breccia dolomite, desiccation-contraction breccia dolomite, desiccation-solution breccia dolomite, channel breccia dolomite and evaporate-solution collapse breccia dolomite. Of these, the first four genetic types dominate, while the last two are only distributed locally.

As the origin of these breccia dolomites is generally related to subaerial exposure, corroded pores and fissures commonly developed at the diagenetic and supergene stages, combining to form a favorable space for the accumulation of oil and gas.

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TITLE: "Analysis of Oil and Gas Potential of China"

SOURCE: Jiangling SHIYOU YU TIANRANQI DIZHI [OIL AND GAS GEOLOGY] in Chinese Vol 2 No 1, Mar 81 pp 47-56

TEXT OF ENGLISH ABSTRACT: The petroleum industry in China has rapidly developed in the past 30 years, its output having risen from a few ten-thousand tons in 1949 to 106 million tons in 1979. However, the output of crude oil increased slowly in recent years and seems to have come to a stop. The reason is not entirely due to the deficiency in resources, but is because we paid too much attention to development and neglected oil prospecting and exploration for many years as a part of the oil and gas prospecting work plans, which resulted in an increase in the rate of crude oil production which was higher than that of reserves.

The authors believe that we have rich oil and gas resources. We have a wide prospect region and various reservoir types, but the degree of prospecting is very low. Therefore, the prospecting work of oil and gas should be strengthened as

[Continuation of SHIYOU YU TIANRANQI DIZHI Vol 2 No 1, Mar 81 pp 47-56]

quickly as possible in order to greatly increase new reserves.

This paper, in comparing the trends of recent domestic and foreign oil and gas prospecting and exploration, points out that our oil and gas prospecting and exploration work in the future must find not only giant, deep and non-anticlinal oil reservoirs, but also natural gas, including coal-forming gas; offshore oil and gas prospecting and exploration work should be consolidated; the prospecting and exploration of middle to small, shallow, anticlinal reservoirs still should not be neglected due to the Mesozoic and Cenozoic continental middle-small basins widespread in China.

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